FIG. 1

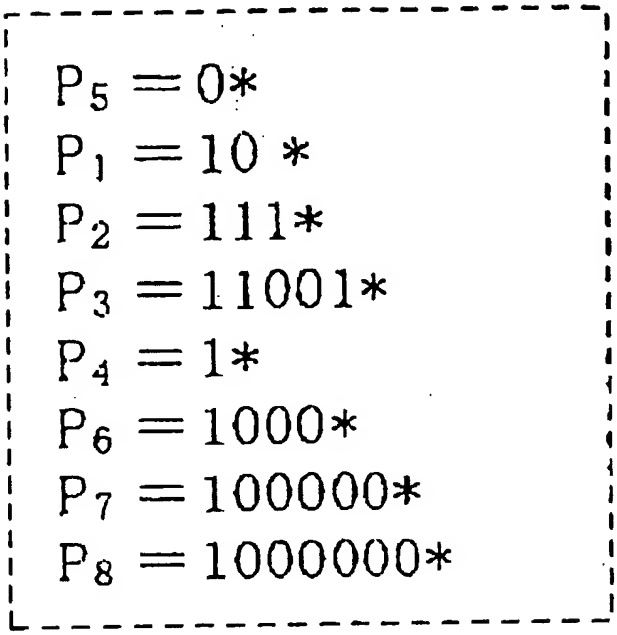


FIG. 2

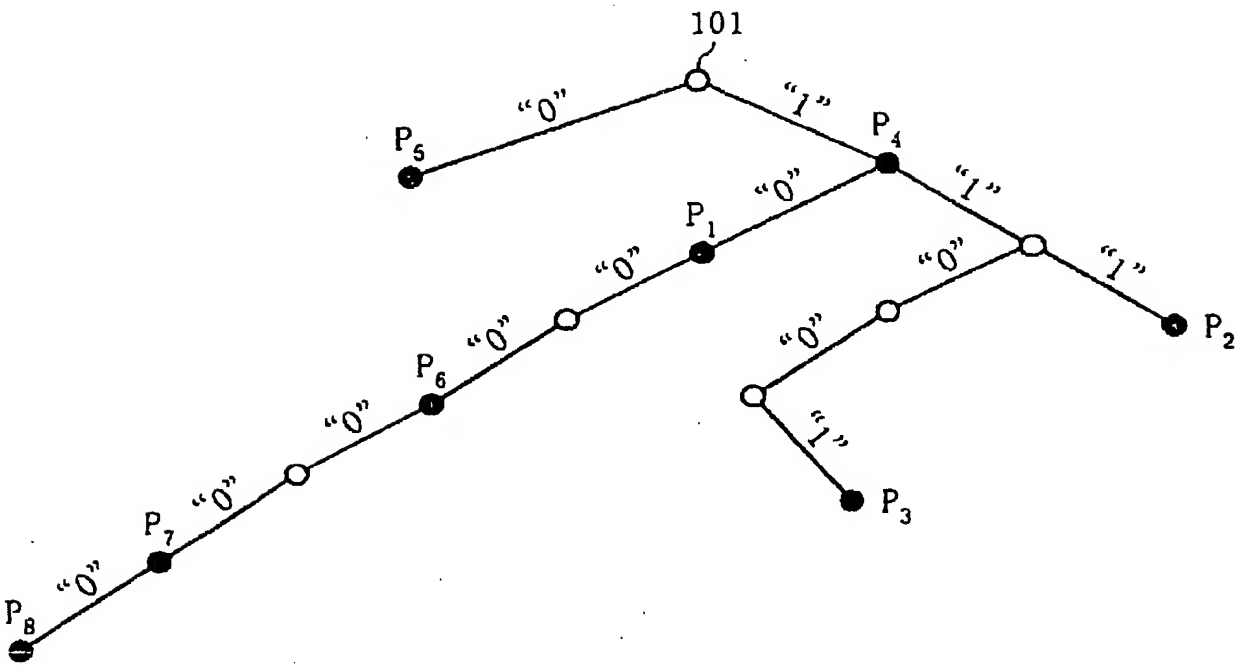


FIG. 3

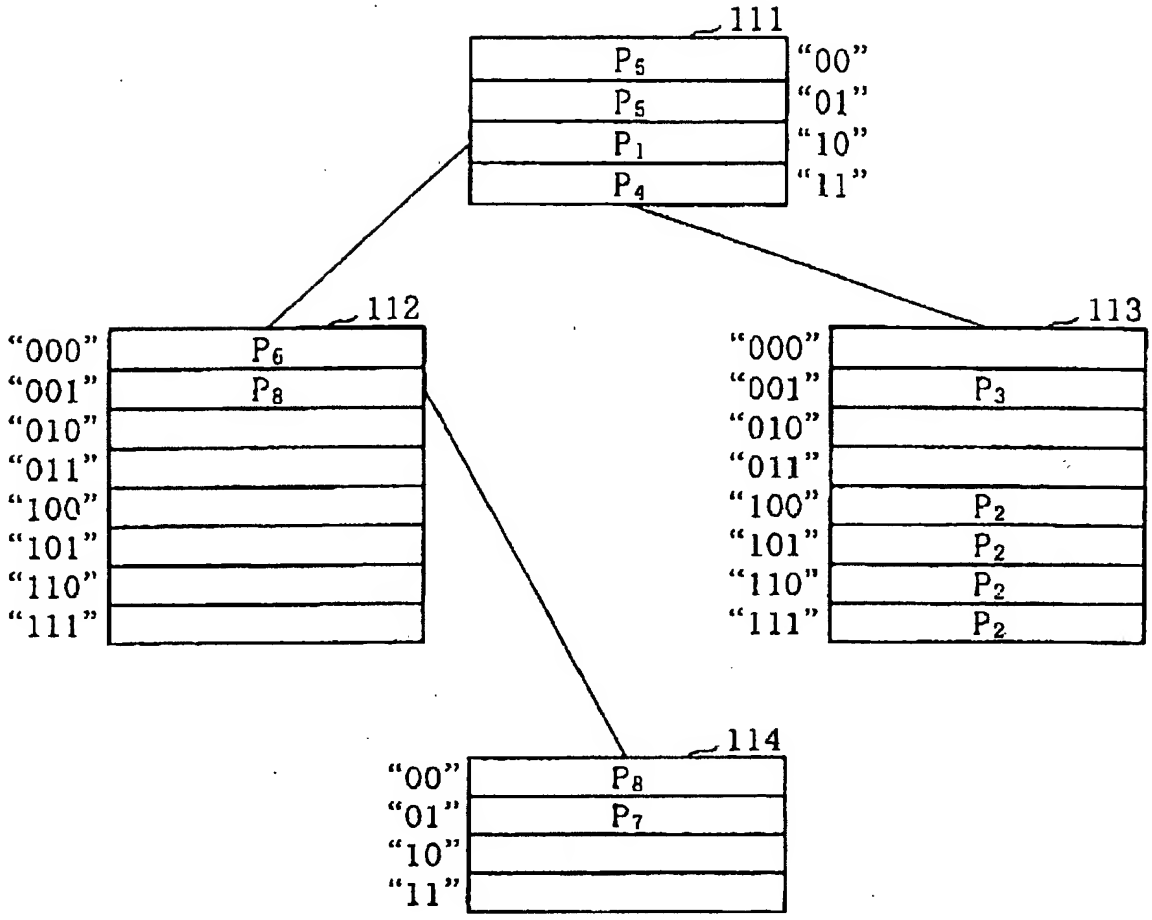

111
P5
P5
P1
P4
"00"
"01"
"10"
"11"
112
"000"
"001"
"010"
"011"
"100"
"101"
"110"
"111"
P6
P8
113
"000"
"001"
"010"
"011"
"100"
"101"
"110"
"111"
P3
P2
P2
P2
P2
114
"00"
"01"
"10"
"11"
P8
P7

FIG. 4

Original	Expanded (3Level$_5$)	
$P_5 = 0*$	00* (P_5)	
$P_1 = 10*$	01* (P_5)	Length2
$P_2 = 111*$	10* (P_1)	
$P_3 = 11001*$	11* (P_4)	
$P_4 = 1*$	11100* (P_2)	
$P_6 = 1000*$	11101* (P_2)	
$P_7 = 100000*$	11110* (P_2)	
$P_8 = 1000000*$	11111* (P_2)	Length5
	11001* (P_3)	
	10000* (P_6)	
	10001* (P_6)	
	1000001* (P_7)	Length7
	1000000* (P_8)	

FIG. 5

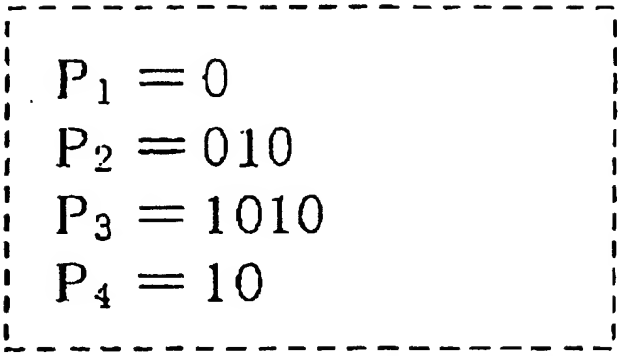


FIG. 6

"0000"	P_1
"0001"	P_1
"0010"	P_1
"0011"	P_1
"0100"	P_2
"0101"	P_2
"0110"	P_1
"0111"	P_1
"1000"	P_4
"1001"	P_4
"1010"	P_3
"1011"	P_4
"1100"	NULL
"1101"	NULL
"1110"	NULL
"1111"	NULL

FIG. 7

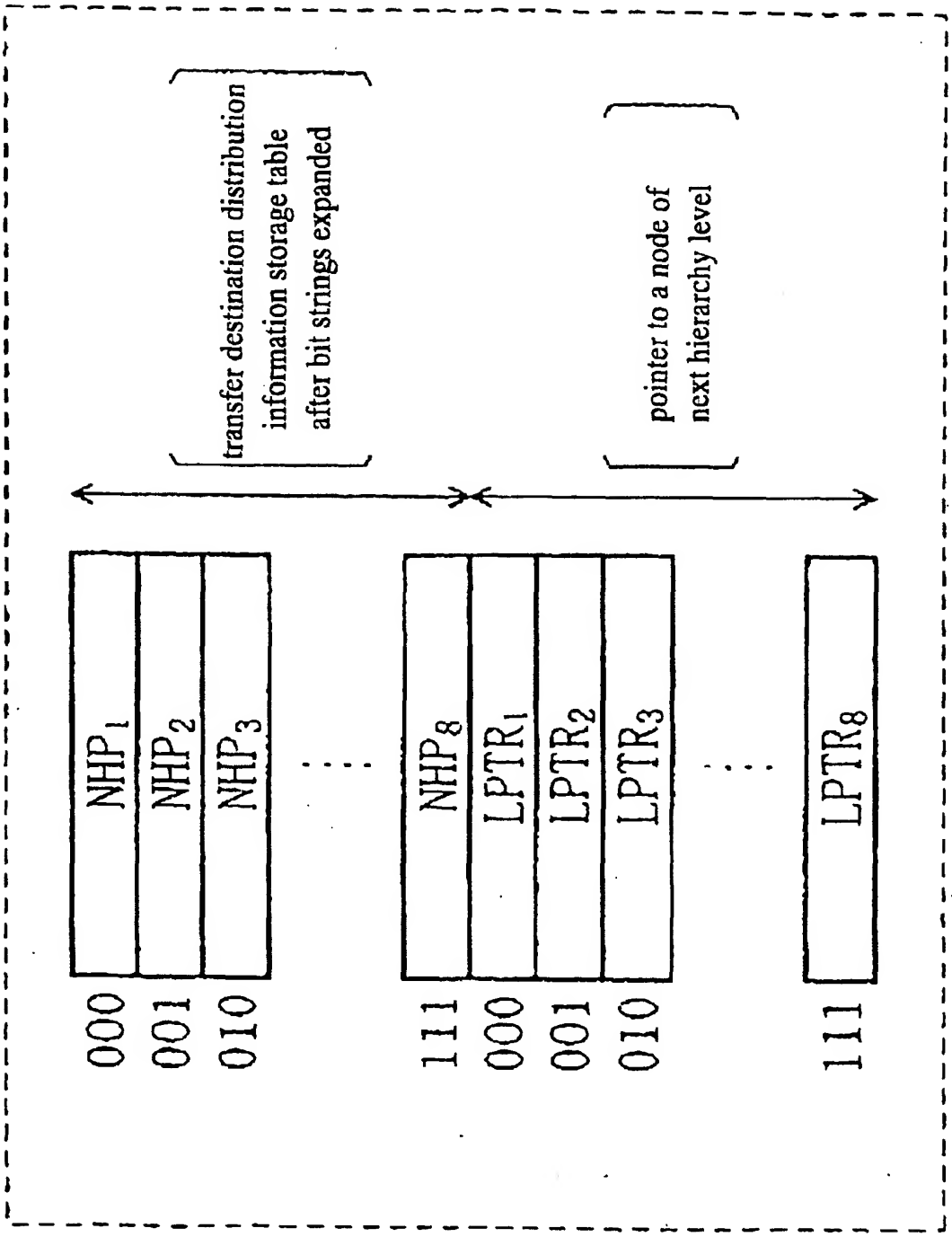

transfer destination distribution information storage table after bit strings expanded
pointer to a node of next hierarchy level
NHP1
NHP2
NHP3
NHP8
LPTR1
LPTR2
LPTR3
LPTR8
000
001
010
111
000
001
010
111

FIG. 8

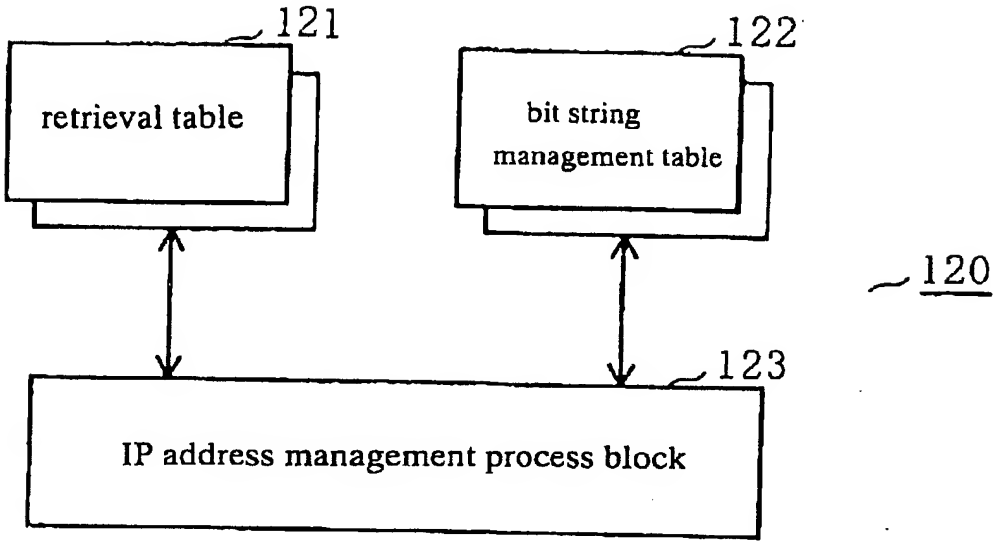

121
retrieval table
122
bit string
management table
120
123
IP address management process block

FIG. 9

(bit renewal process)

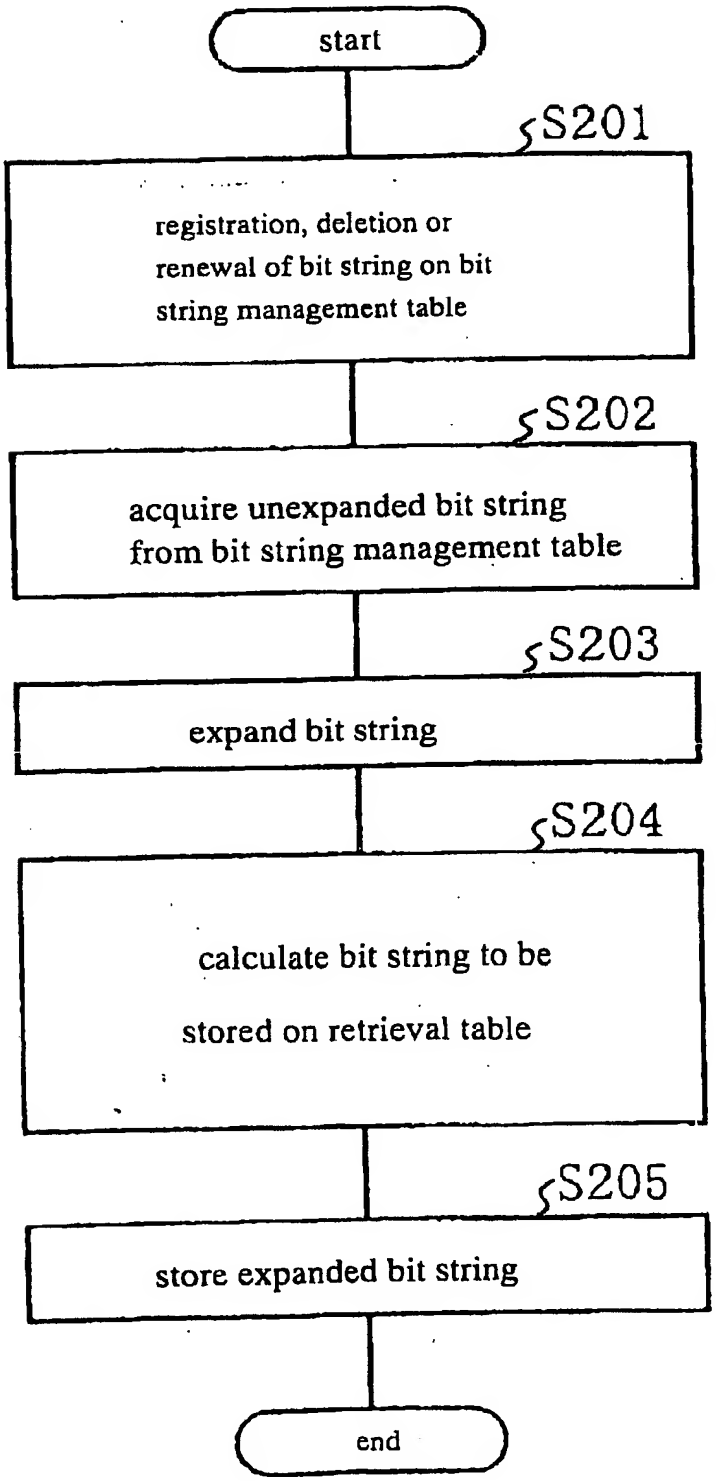


FIG. 10

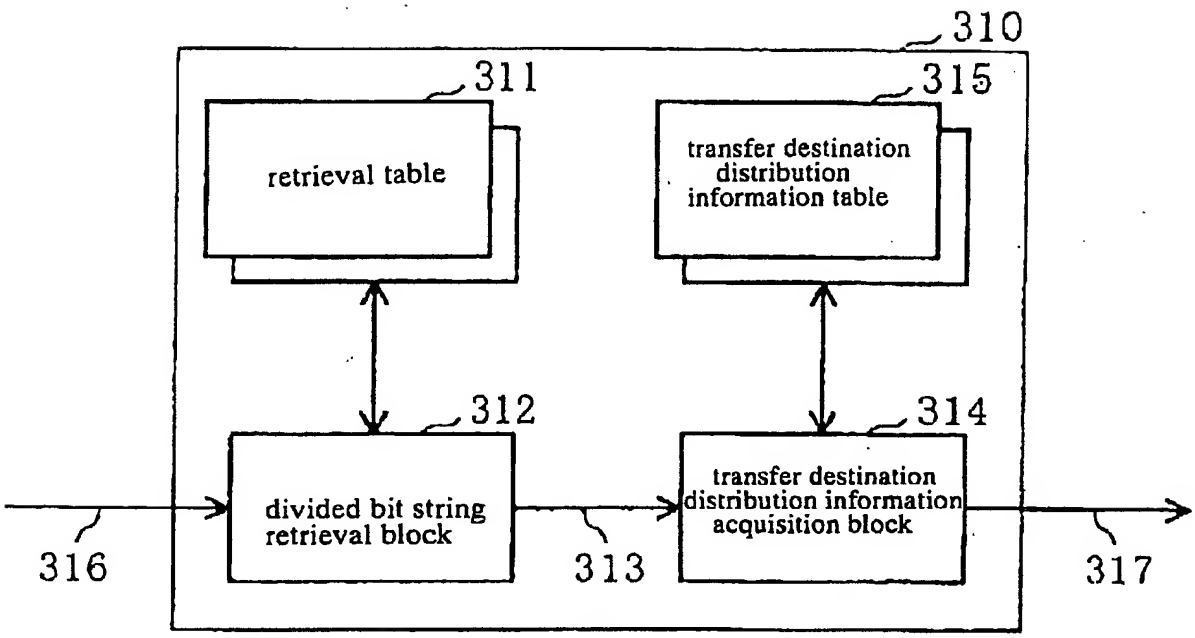

310
311
retrieval table
315
transfer destination distribution information table
312
divided bit string retrieval block
314
transfer destination distribution information acquisition block
316
313
317

FIG. 11

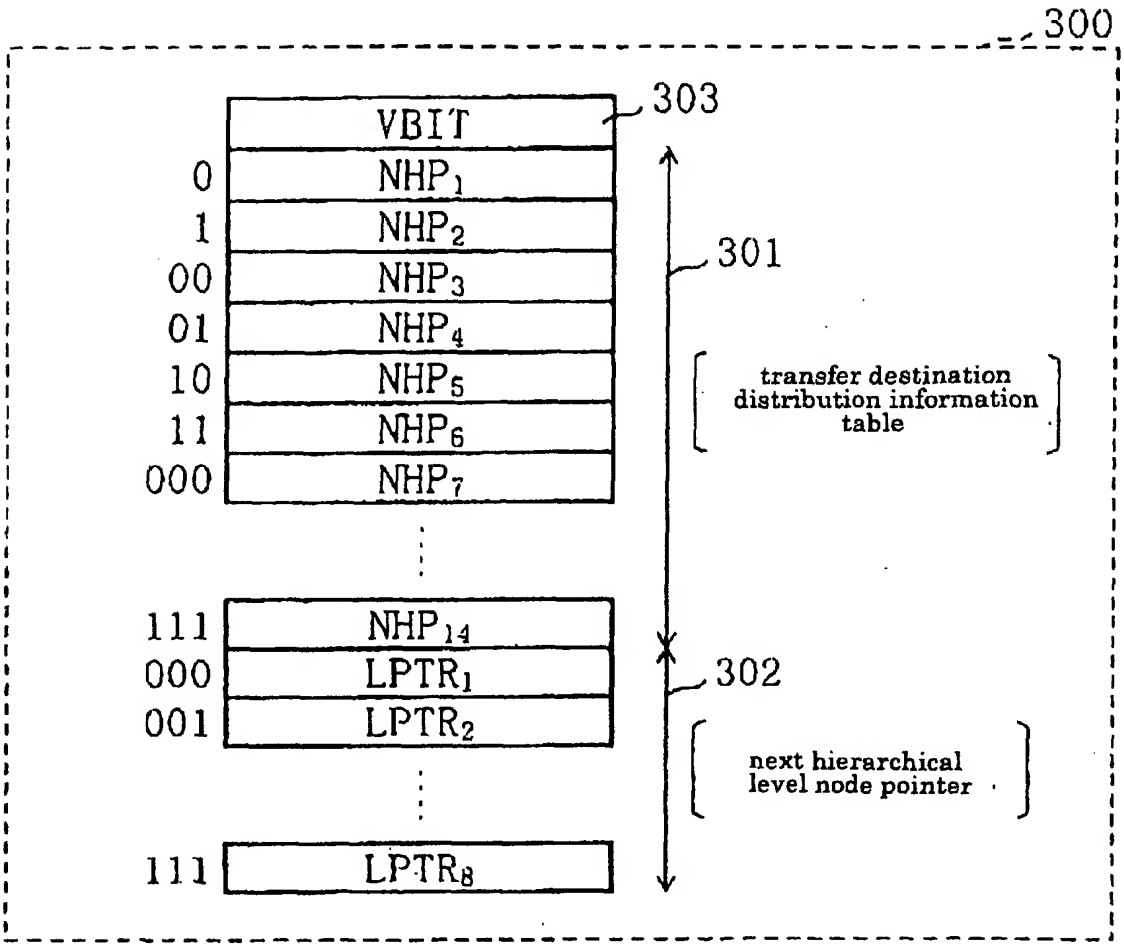

300
303
VBIT
0 NHP1
1 NHP2
00 NHP3
01 NHP4
10 NHP5
11 NHP6
000 NHP7
301
transfer destination distribution information table
111 NHP14
000 LPTR1
001 LPTR2
302
next hierarchical level node pointer
111 LPTR8

FIG. 12

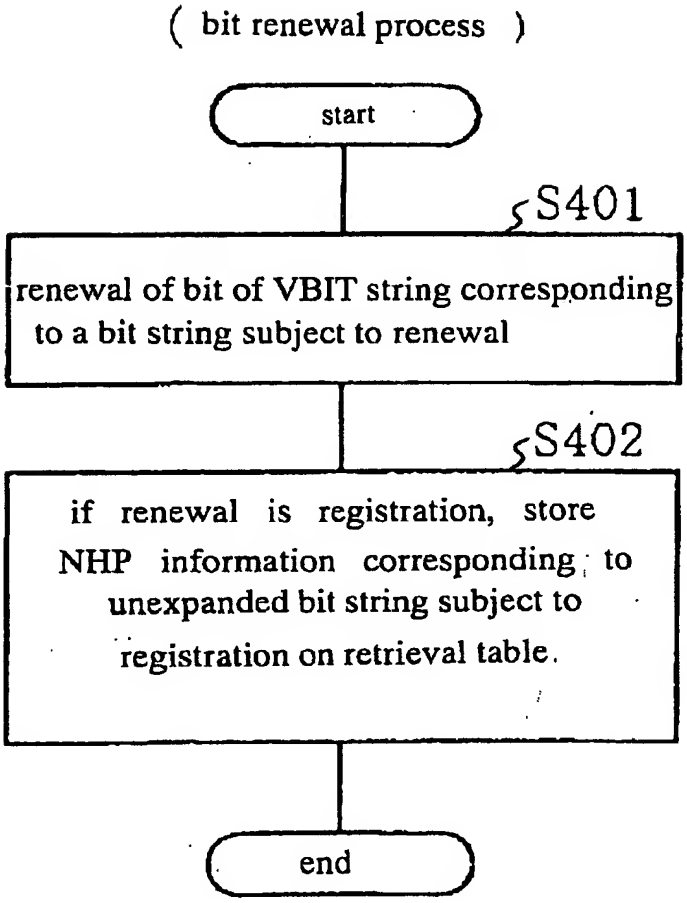

(bit renewal process)
start
S401
renewal of bit of VBIT string corresponding to a bit string subject to renewal
S402
if renewal is registration, store NHP information corresponding to unexpanded bit string subject to registration on retrieval table.
end

FIG. 13

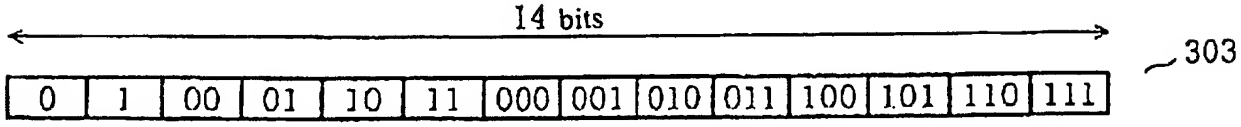


FIG. 14

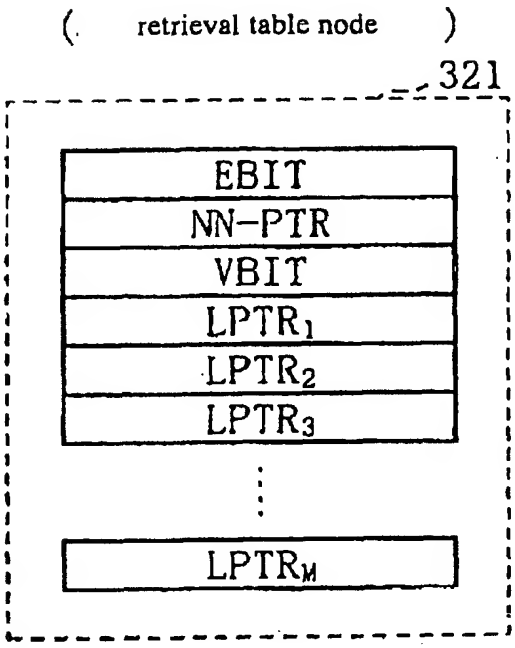

(retrieval table node)
321
EBIT
NN-PTR
VBIT
LPTR1
LPTR2
LPTR3
LPTRM

FIG. 15

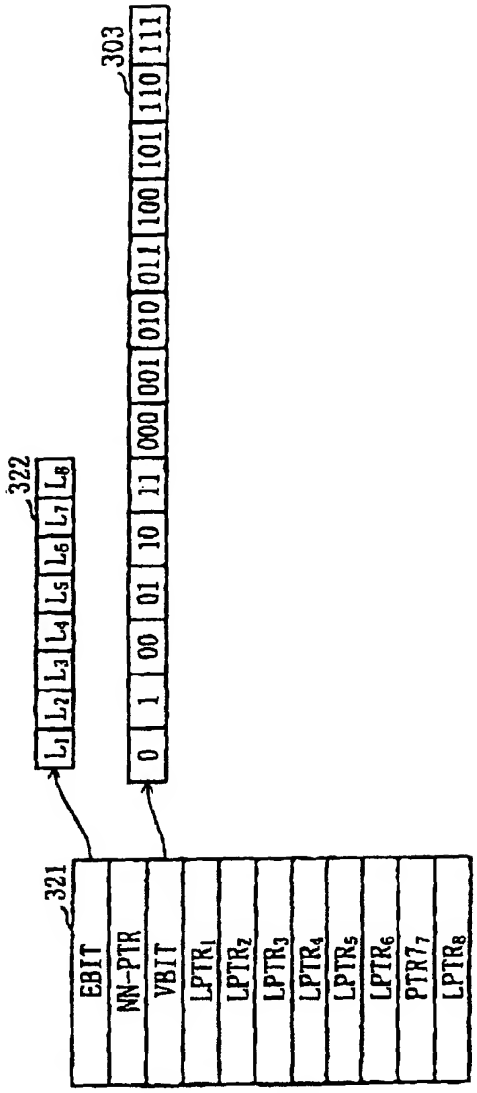

303
0
1
00
01
10
11
000
001
010
011
100
101
110
111
322
L1
L2
L3
L4
L5
L6
L7
L8
321
EBIT
NN-PTR
VBIT
LPTR1
LPTR2
LPTR3
LPTR4
LPTR5
LPTR6
PTR7 7
LPTR8

FIG. 16

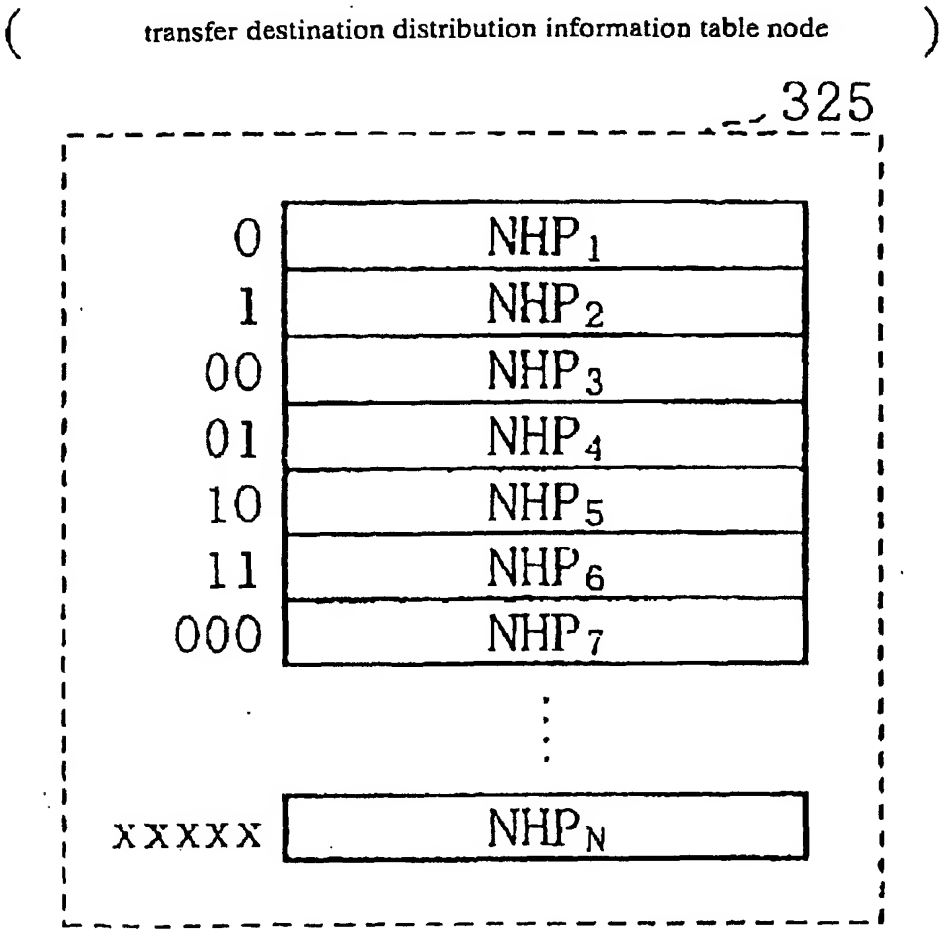

(transfer destination distribution information table node)
325
0
NHP1
1
NHP2
00
NHP3
01
NHP4
10
NHP5
11
NHP6
000
NHP7
xxxxx
NHPN

FIG. 17

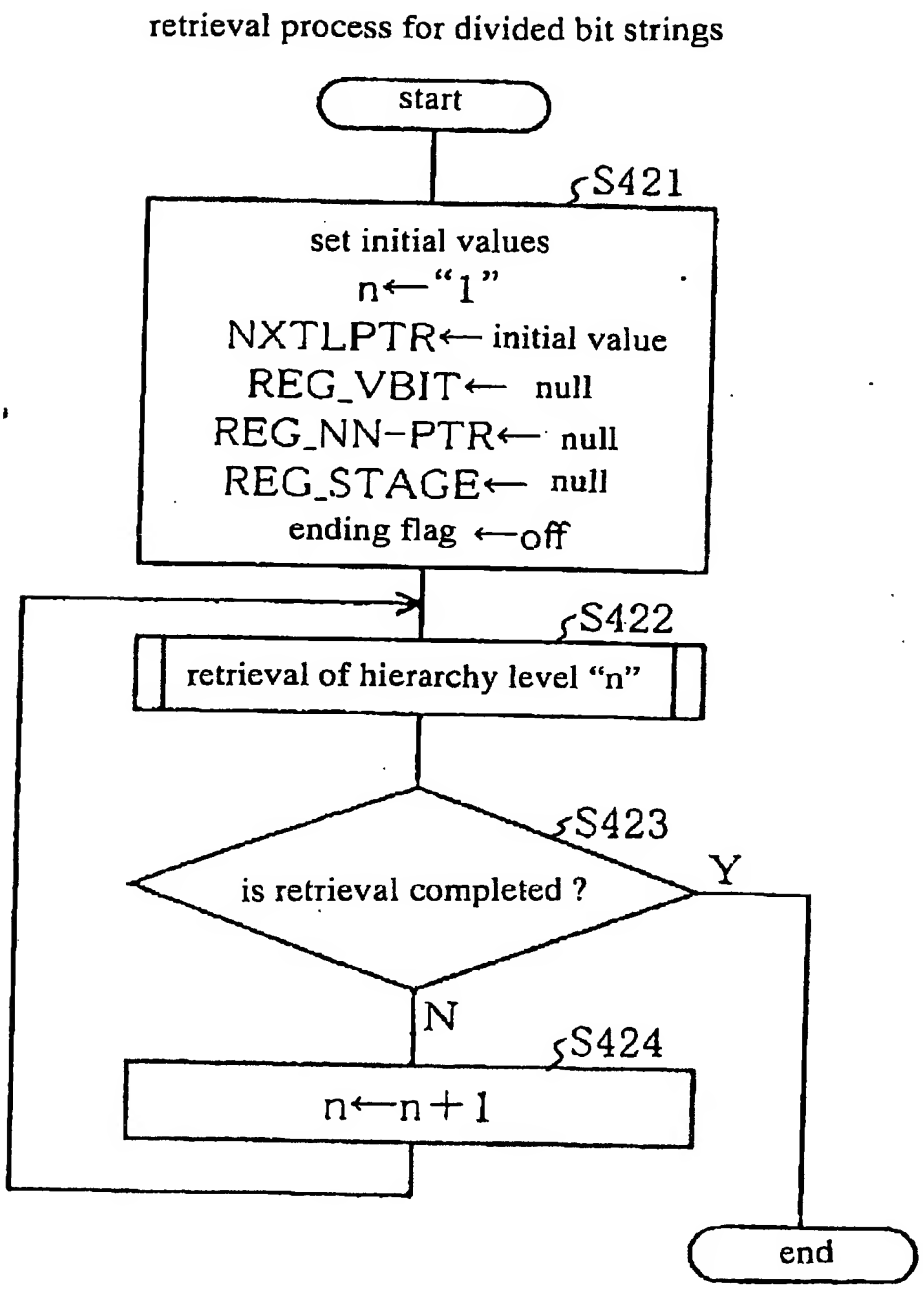

retrieval process for divided bit strings
start
S421
set initial values
n←"1"
NXTLPTR← initial value
REG_VBIT← null
REG_NN-PTR← null
REG_STAGE← null
ending flag ←off
S422
retrieval of hierarchy level "n"
S423
is retrieval completed ?
Y
N
S424
n←n+1
end

FIG. 18

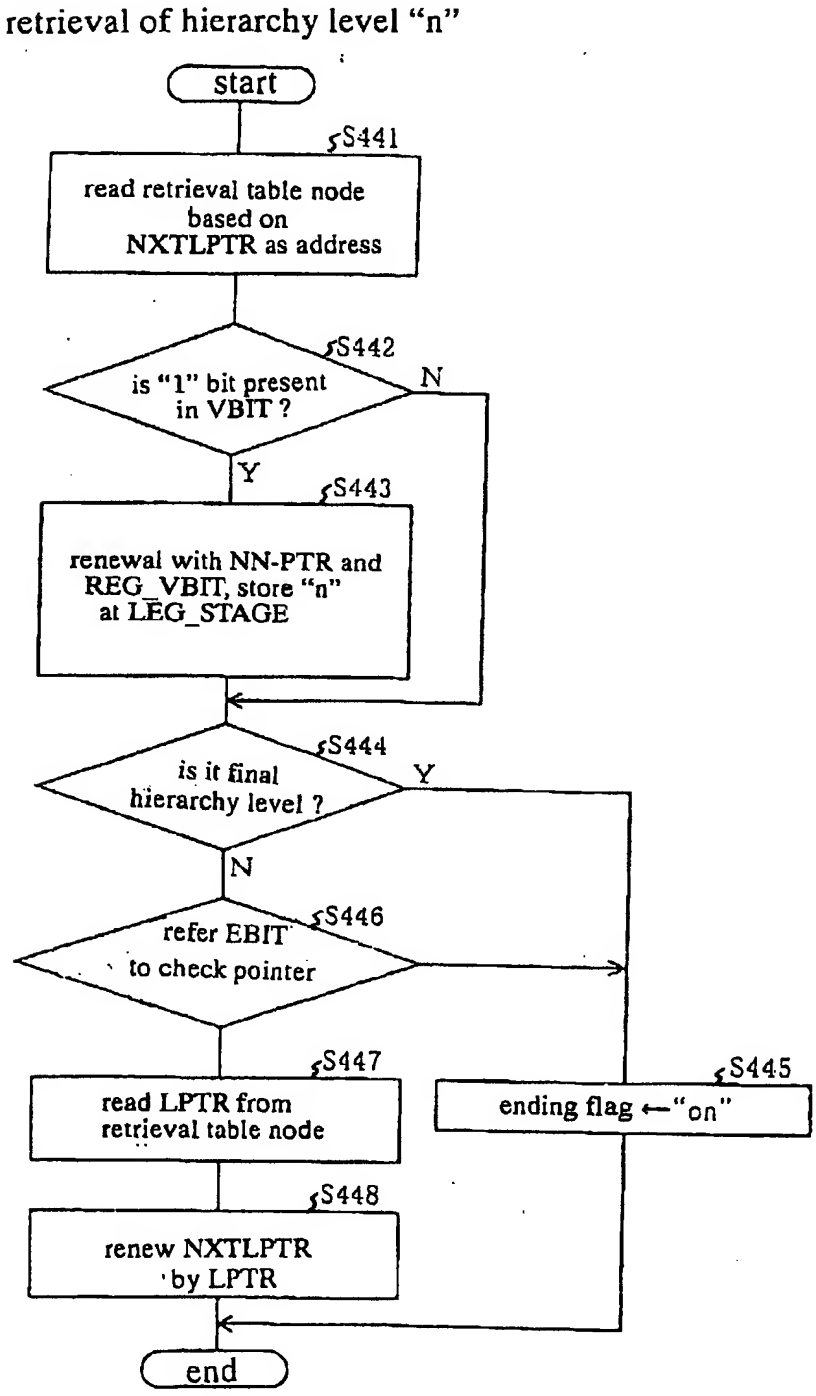

retrieval of hierarchy level "n"
start
S441
read retrieval table node based on NXTLPTR as address
S442
is "1" bit present in VBIT ?
N
Y
S443
renewal with NN-PTR and REG_VBIT, store "n" at LEG_STAGE
S444
is it final hierarchy level ?
Y
N
S446
refer EBIT to check pointer
S447
read LPTR from retrieval table node
S448
renew NXTLPTR by LPTR
S445
ending flag ← "on"
end

FIG. 19

acquiring process for transfer destination distribution information

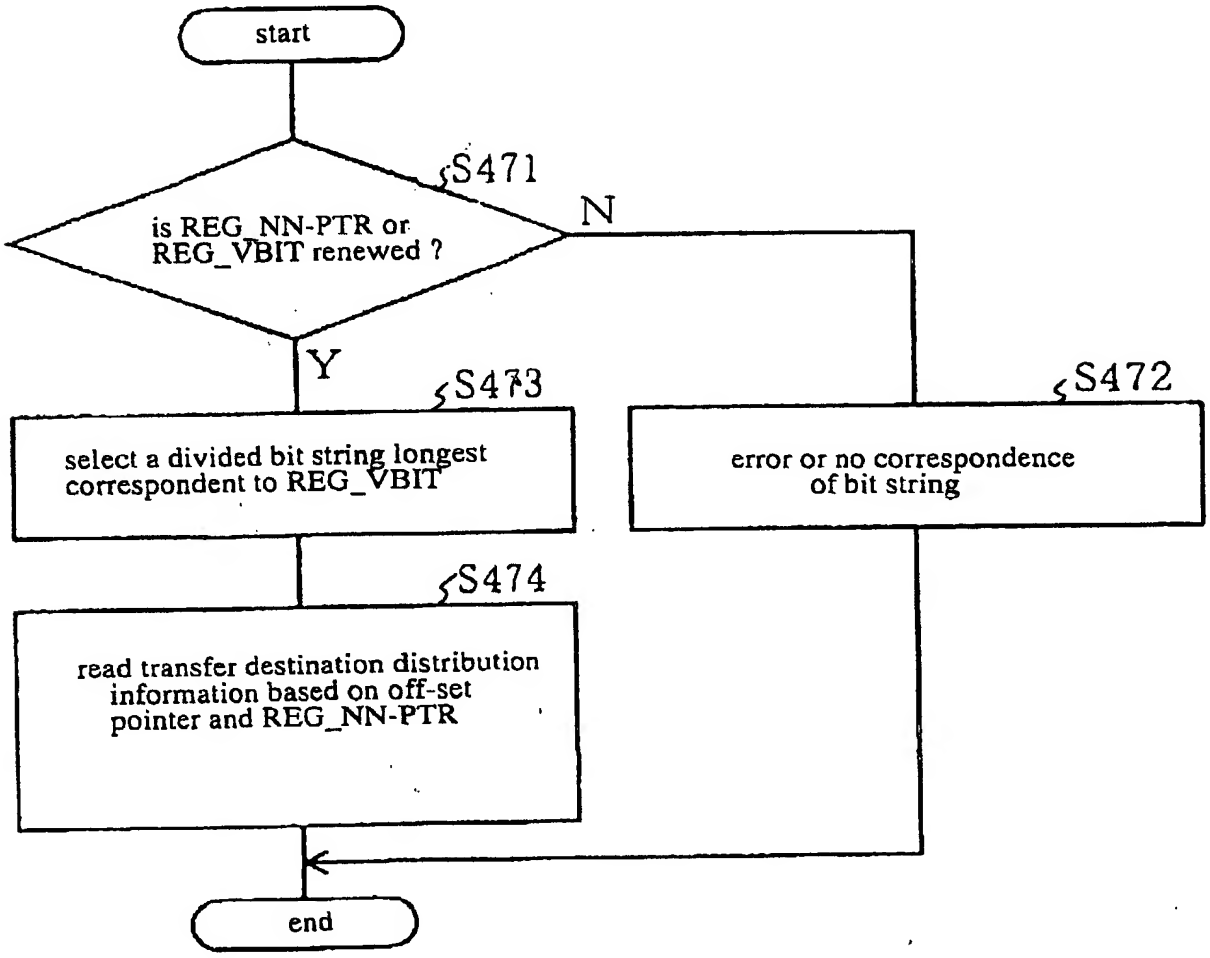


FIG. 20

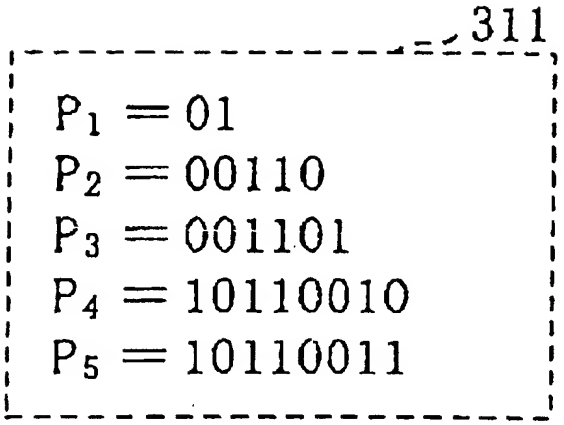


FIG. 21

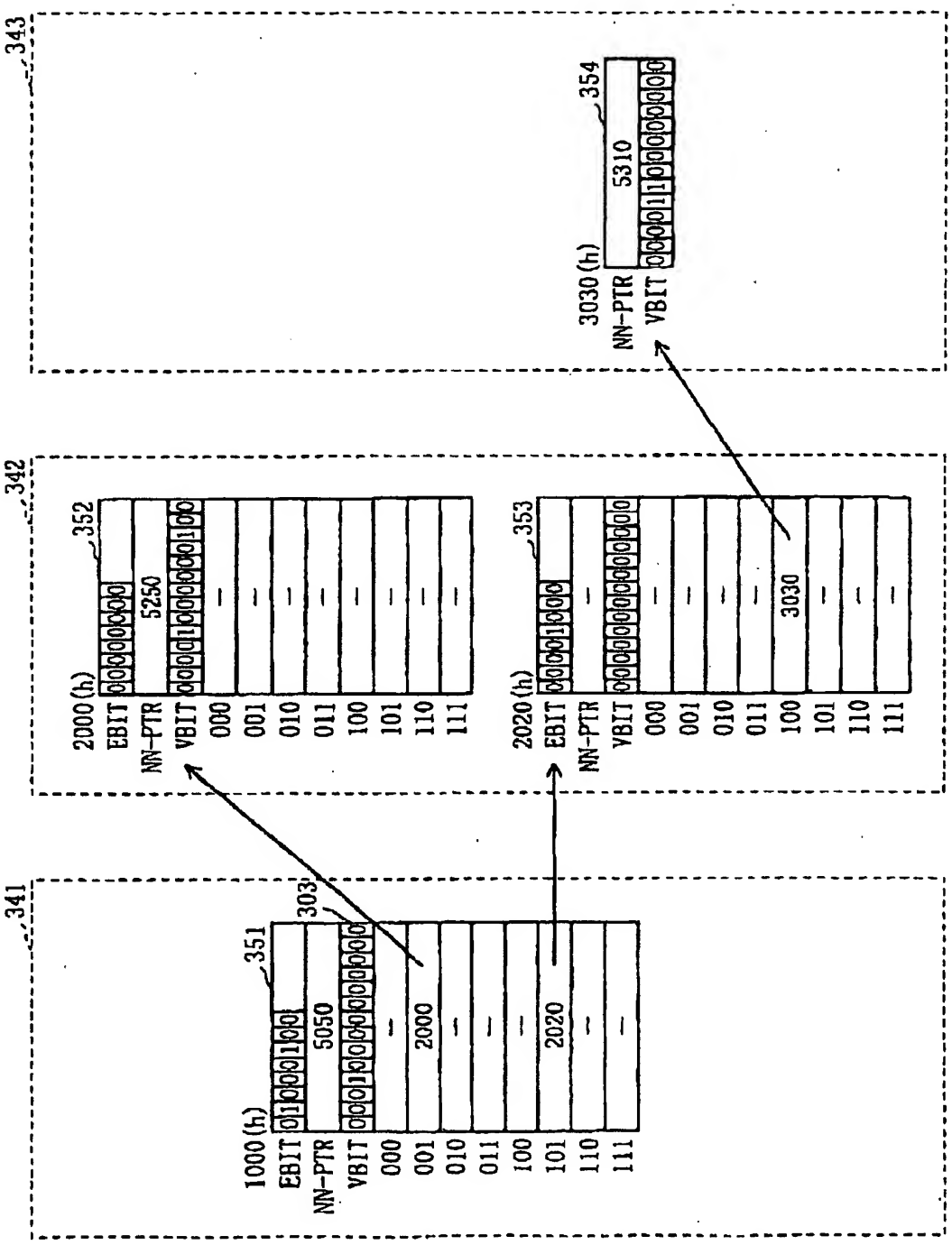

343
354
3030 (h)
NN-PTR
VBIT
5310
342
352
2000 (h)
EBIT
NN-PTR
VBIT
5250
000
001
010
011
100
101
110
111
353
2020 (h)
EBIT
NN-PTR
VBIT
3030
341
303
351
1000 (h)
EBIT
NN-PTR
VBIT
5050
2000
2020

FIG. 22

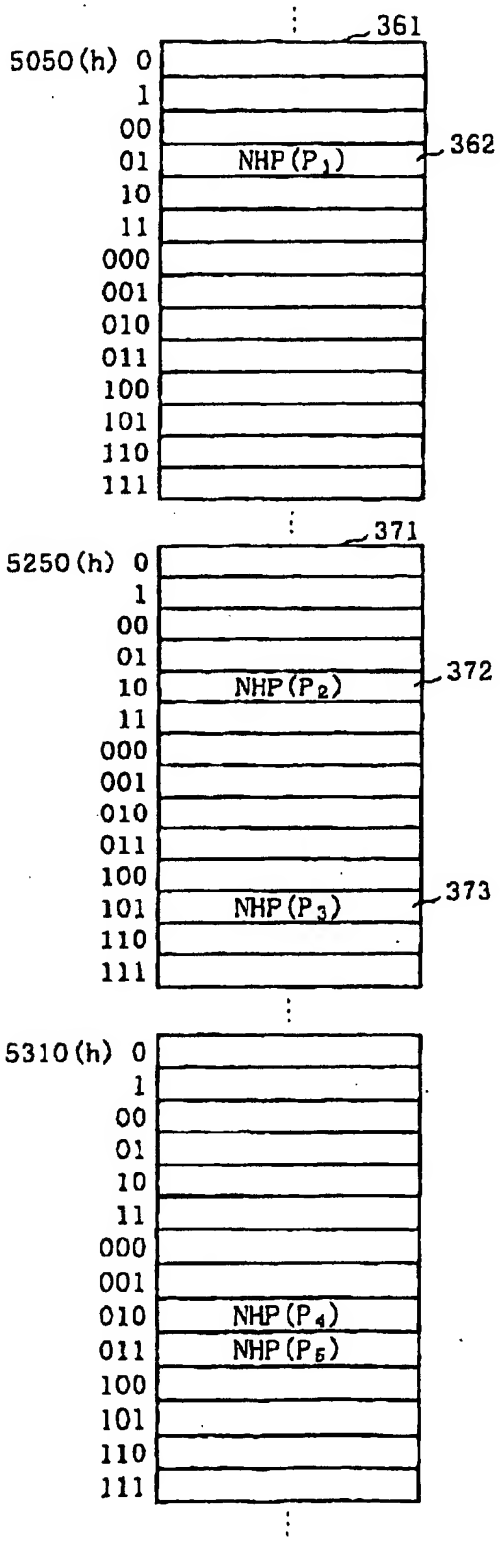

361
5050(h) 0
1
00
01
NHP(P1)
362
10
11
000
001
010
011
100
101
110
111
371
5250(h) 0
1
00
01
10
NHP(P2)
372
11
000
001
010
011
100
101
NHP(P3)
373
110
111
5310(h) 0
1
00
01
10
11
000
001
010
NHP(P4)
011
NHP(P5)
100
101
110
111

FIG. 23

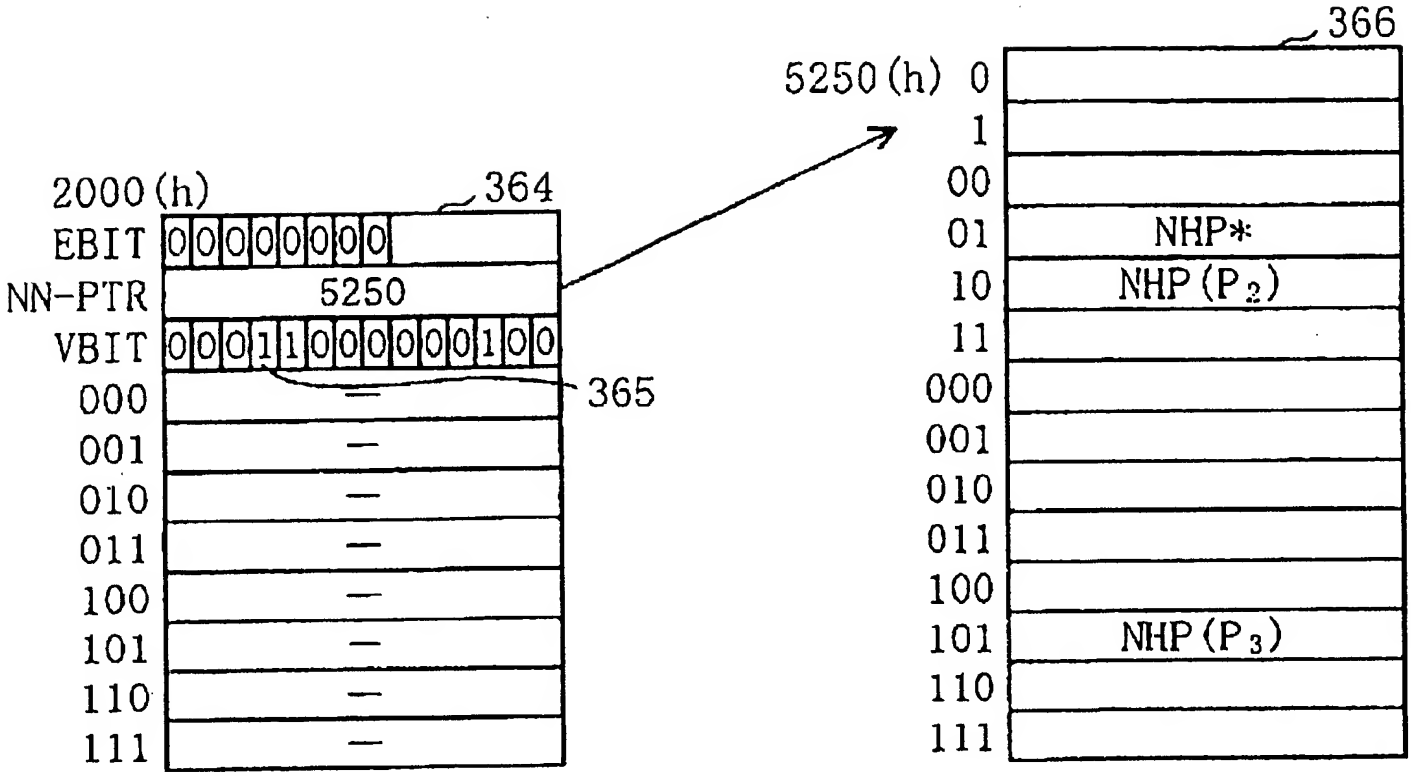

2000(h)
364
EBIT
0 0 0 0 0 0 0 0
NN-PTR
5250
VBIT
0 0 0 1 1 0 0 0 0 0 0 0 1 0 0
000
001
010
011
100
101
110
111
365
366
5250(h)
0
1
00
01
NHP*
10
NHP(P2)
11
000
001
010
011
100
101
NHP(P3)
110
111

FIG. 24

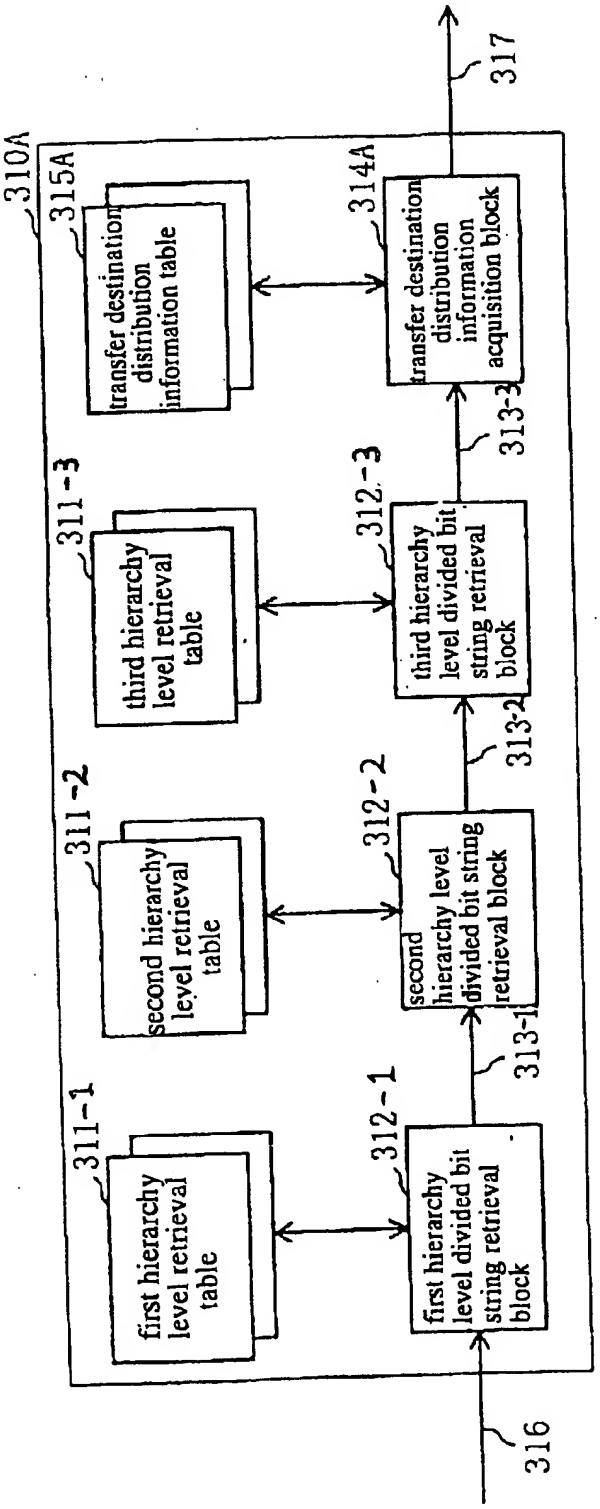
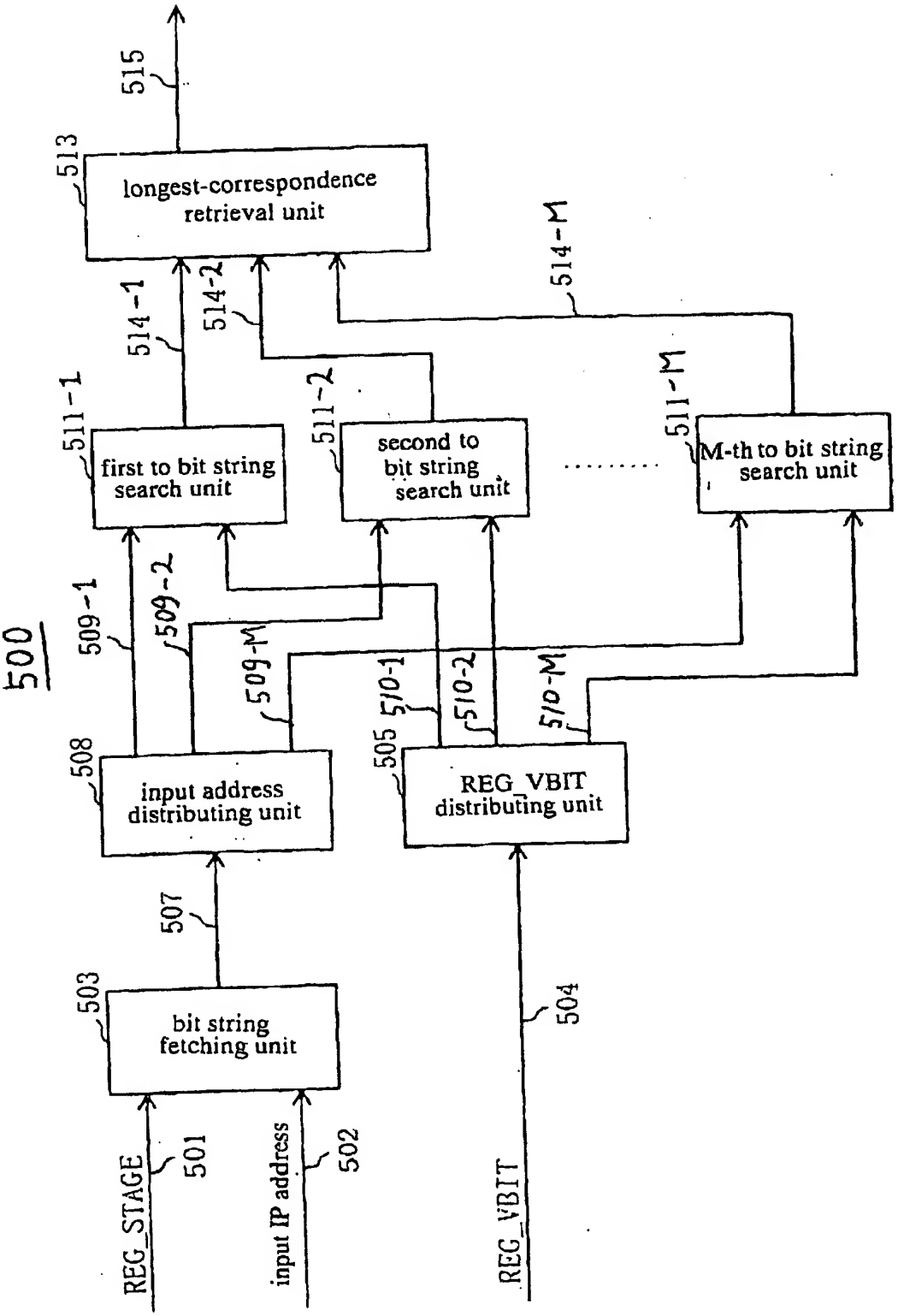

310A
315A
transfer destination distribution information table
314A
transfer destination distribution information acquisition block
317
311-3
third hierarchy level retrieval table
312-3
third hierarchy level divided bit string retrieval block
313-3
311-2
second hierarchy level retrieval table
312-2
second hierarchy level divided bit string retrieval block
313-2
311-1
first hierarchy level retrieval table
312-1
first hierarchy level divided bit string retrieval block
313-1
316

FIG. 25


500
515
513
longest-correspondence retrieval unit
514-1
514-2
514-M
511-1
first to bit string search unit
511-2
second to bit string search unit
511-M
M-th to bit string search unit
509-1
509-2
509-M
510-1
510-2
510-M
508
input address distributing unit
505
REG_VBIT distributing unit
507
503
bit string fetching unit
504
REG_STAGE
501
input IP address
502
REG_VBIT